

Cunningham RADIO TUBES

CX-332

RADIO-FREQUENCY AMPLIFIER

The '32 is a screen grid tube recommended primarily for use as a radio-frequency amplifier. It contains a coated filament which takes as little power as possible consistent with satisfactory operating performance. This feature makes the '32 particularly suitable in battery-operated radio receivers employing the '34, '31, and/or '33 where economy of filament current drain is important.

CHARACTERISTICS

Filament Voltage (D. C.)		2.0	Volts
Filament Current		0.060	Ampere
Plate Voltage	135	180 *max.*	Volts
Screen Voltage	67.5	67.5 *max.*	Volts
Grid Voltage	−3	−3	Volts
Plate Current	1.7	1.7	Milliamperes
Screen Current (Maximum)	0.4	0.4	Milliampere
Plate Resistance	950000	1200000	Ohms
Amplification Factor	610	780	
Mutual Conductance	640	650	Micromhos
Effective Grid-Plate Capacitance	0.015 *maximum*		μμf.
Input Capacitance	6.0		μμf.
Output Capacitance	11.7		μμf.
Overall Length			4 25/32" to 5 1/32"
Maximum Diameter			1 13/16"
Bulb (See page 42, Fig. 11)			S-14
Cap			Small Metal
Base			Medium 4-Pin

INSTALLATION

The **base** pins of the '32 fit the standard four-contact socket. The socket should be installed so that the tube will operate in a vertical position. Although the '32 is very free from microphonic disturbances, cushioning of its socket may be found desirable. For socket connections, see page 39, Fig. 4.

The coated **filament** of the '32 may be operated conveniently from dry-cells, from a single lead storage-cell, or from an air-cell battery. For dry-cell operation, a filament rheostat should be used together with a permanently installed voltmeter to insure the proper filament voltage. For operation from a 2-volt lead storage-cell, the '32 requires no filament resistor. Operation with an air-cell battery requires a fixed resistor in the filament circuit. This resistor should have a value such that with a new air-cell battery, the voltage applied across the filament terminals will not initially exceed 2.15 volts. *Series operation of the filaments of these tubes is not recommended.*

The positive **screen voltage** may be obtained from a tap on the plate battery or a bleeder circuit across the supply battery in part or in full. Never attempt to obtain the screen voltage for the '32 by connecting the screen through a series resistor to a high voltage source. The results will not be satisfactory because of voltage drop variation produced by the different screen currents of individual tubes.

Volume control may be very satisfactorily accomplished by variation of the screen voltage between 0 and 67.5 volts. The variation must, however, be accomplished

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by a potentiometer shunted across the screen voltage supply and not by a high-resistance rheostat.

Complete **shielding** of all stages is recommended if maximum gain per stage is to be obtained.

APPLICATION

As a **radio-frequency amplifier,** the '32 is operated as shown under CHARACTERISTICS. Neither the plate voltage nor the screen voltage is critical. In general, properly designed radio-frequency transformers are preferable to interstage coupling impedances, especially in cases where a high impedance B-supply may cause oscillation below radio frequencies.

As a **detector,** the '32 may be operated either with grid leak and condenser or with grid bias. For grid bias detection, suitable operating conditions are: Plate supply voltage, 135 volts applied through a plate coupling resistance of 100000 ohms or an equivalent impedance; positive screen voltage, 67.5 volts; and a negative grid bias (approximately 6 volts) so adjusted that a plate current of 0.2 milliampere is obtained with no a-c input signal. For grid leak and condenser detection, suitable operating conditions are: Plate supply voltage, 135 volts applied through a plate coupling resistor of 250000 ohms; a positive screen voltage up to 45 volts; a grid condenser of 0.00025 µf.; and a grid leak of 1 to 5 megohms.

In designing circuits to use the '32 as a detector, it is desirable to work from the detector stage directly into the power output stage.

As an **audio-frequency amplifier** in resistance coupled circuits, the '32 may be operated under the following conditions: Plate supply voltage, 180 volts applied through a plate coupling resistor of 100000 to 250000 ohms (or a 500 henry choke shunted by a 0.25 megohm resistor); plate current, 0.25 milliampere (approximate); grid voltage, –1 volt; and a grid resistor, 0.25 to 2.0 megohms.

AVERAGE PLATE CHARACTERISTICS

